

## Supplemental Support Systems

Whether they arise from storm damage, pruning, or natural causes like codominant stems, many trees can end up with structural weakness and/or defects. Thankfully, a “risky” tree or limb does **not** always have to be removed after [proper assessment](#). Rather, a supplemental support system can often be installed to mitigate potential structural risks.

RTS installs supplemental support systems in accordance with ANSI A300 (Part 3) - Supplemental Support Systems. Not only because we **must** as [ISA Certified Arborists®](#), but also because it ensures a quality installation that adheres to recognized industry standards.

Four common types of supplemental support systems exist:

**Cabling** – Connecting two parts of the tree with a metal or synthetic cable. Trees that have cracks, cavities, or other aggravating factors are often candidates for cabling. When applicable, RTS favors the use of the **Cobra® cabling system** due to its many advantages.

**Bracing** – Installing a bolt or threaded rod through the tree. Large cracks in stems and/or branches can be stabilized via bracing. Typically, a cable is also used above the bracing.

**Guying** – Installing a cable to secure the tree to the ground or another fixed structure to stabilize it.

**Propping** – Putting a rigid support underneath the part of the tree that needs it.





**Upper Left: Cabling**  
**Upper Right: Bracing**  
**Lower Right: Guying**  
**Lower Left: Propping**

# *cobra*<sup>®</sup>

## TREE BRACING

Tree support  
has a name -  
**cobra** - worldwide



**pbs**  
Baumsicherungsprodukte



# The **cobra**-System

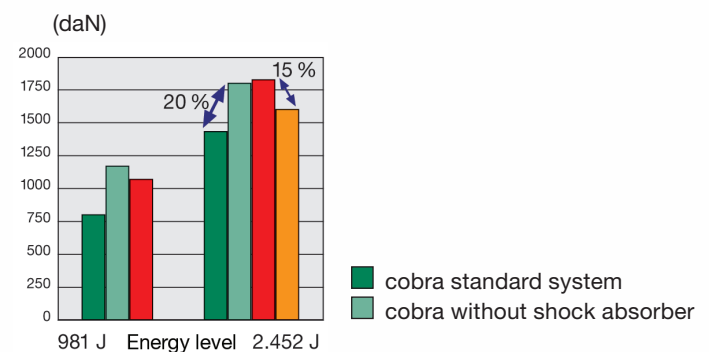
**cobra** is a dynamic tree support system specially designed to be flexible and shock-absorbing. The system was conceived in response to functional insights and scientific research results. Based on these findings, the **cobra** system has been perfected for successful use, down to the smallest detail.

Developed with practical scientific support for practical use, **cobra** has contributed to preserving valuable trees inexpensively and safely. Precise knowledge of a tree's vital needs played a decisive role in design of the system. If the tree is to strengthen itself, a shock-absorbing unit, which can be integrated with a cable, will support compensating growth by means of a defined, low-resistance oscillation. But even without the shock absorber, the system is fully functional and flexible enough to absorb and reduce impacts caused by oscillation.

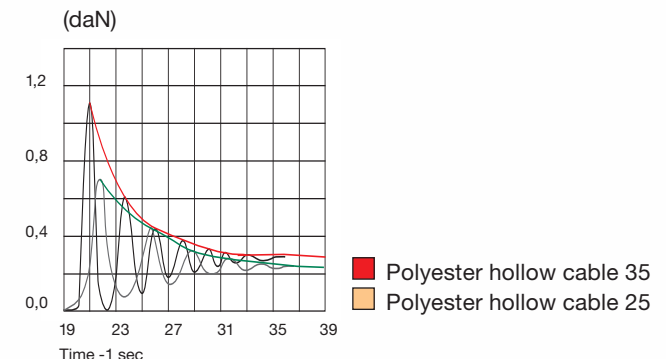
Scientific control studies have shown the longevity of the **cobra** system. Its strength decrease (under 2% per year) is recognized as acceptable by scientists in the field. As a result, the system, if installed according to specifications, should not require replacement for at least twelve years.

Although the **cobra** system consists of a number of separate parts, according to ZTV Baumpflege (German tree care standards), it is considered a single-component system because the traction is provided by a single, uninterrupted component.

Impulse strength, average heavy load



Impulse course for low load



# The **cobra** Variants - Assembly

The cobra crown stabilization system has been designed for uncomplicated and safe use, which simplifies work procedures.

## **cobra plus 2 t** **NEW**

- Material: Monofilament polypropylene hollow cable, Ø 14 mm, tensile strength 3.45 metric tons\*, ductile yield 7.5 % per metric ton
- Creep behavior in tensile strength: Strength decrease in the range of < 2 % per year
- Application:
  - a) As dynamic breaking-bracing system for branches up to Ø 40 cm
  - b) As load-bracing system for branches up to Ø 30 cm (according to ZTV Baumpflege = German tree care standard)
- Useful life: 15 years

## **cobra plus 4 t** **NEW**

- Material: Monofilament polypropylene hollow cable, Ø 22 mm; tensile strength 6.1 metric tons\*; ductile yield 4.2% per metric ton
- Creep behavior in tensile strength: Strength decrease in the range of < 2 % per year
- Application:
  - a) As dynamic breaking-bracing system for branches from Ø 40 to 60 cm
  - b) As static breaking-bracing system for branches up to Ø 40 cm
  - c) As load-bracing system for branches from Ø 30 to 40 cm. (according to ZTV Baumpflege = German tree care standard)
- Connecting crown with close surrounding trees
- Useful life: 15 years

## **cobra 8 t** **NEW**

- Material: Monofilament polypropylene hollow cable, Ø 28 mm; tensile strength 11.35 metric tons\*; ductile yield 2% per metric ton
- Creep behavior in tensile strength: Strength decrease in the range of < 2 % per year
- Application:
  - a) As dynamic breaking-bracing system for branches from Ø 60 to 80 cm
  - b) As static breaking-bracing system for branches from Ø 40 to 60 cm
  - c) As load-bracing system for branches from Ø 40 to 60 cm. (according to ZTV Baumpflege = German tree care standard)
- Useful life: 8 years

**1. Installation of expansion band.**  
Choose the appropriate length (see p. 9).  
At least circumference of branch plus 20 cm from the end of the cable, contract the cable and insert the expansion band into the inside of the rope.

**2. Cut abrasion sheath to length**  
Length = branch circumference

**3. Make quick splice.**  
Clasp the end of the rope and feed it approximately 30 cm through the inside (1/2 diameter) and out again.



**cobra ultrastatic**

Dyneema hollow cable with special braid for quick splicing

**cobra ultrastatic**

Wide-strip loop with Dyneema core for secure, low-expansion attachment

## **cobra ultrastatic**

- Material: Dyneema hollow cable; Ø 10 mm; tensile strength 9 metric tons\*\*; ductile yield 0.2% per metric ton
- Special braid for quick splicing
- Application:
  - a) As static breaking-bracing system for branches up to Ø 40 cm
  - b) As load-bracing system for branches from Ø 30 to 40 cm
- 8 times lighter than steel

\* Important because crown stabilization is not the tensile strength of the individual components but instead is the carrying capacity of the system as a whole. Any redirection of rope leads to a decrease in strength. With Cobra, neither quick splice nor tension loop results in loss of cable strength.

\*\* The collapse load is not the important factor with the use of Cobra Ultrastatic. Instead, it is the restraint of movement; as a result, the emphasis is on the lowest possible amount of cable stretching.

### **4. Make the compensation loop.**

Make a loop approximately 10 cm in diameter, then reinsert the cable end approximately 10 cm into the inside of the rope and pull it back out. This loop is for tension, to accommodate tree growth, and as a control.

### **5. Install shock absorber.**

Lubricate the tip. At a convenient spot, contract the cable and insert the shock absorber into the inside of the rope through the braids.

### **6. Cut off excess rope and install heat-shrink end caps.**

Push end cap at least 10 cm over the end of the cable. Heat the end with a blow torch until the end begins to crinkle. Then push the cap back to the tip of the cable and heat-shrink the cap onto the end.





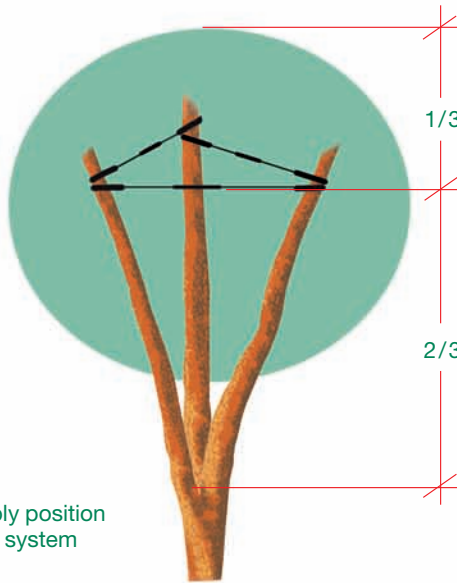
## cobra Assembly

Practical tips on operation and measurements, as well as training schedules.

The dynamic bracing system reduces sudden stress, thus preventing branches from breaking during storms and hurricanes. The static load-bracing system prevents the branch from falling if it breaks (see ZTV Baumpflege).

Optimum effectiveness can be achieved by installing the bracing system 2/3rds the height of the stem above the crotch.

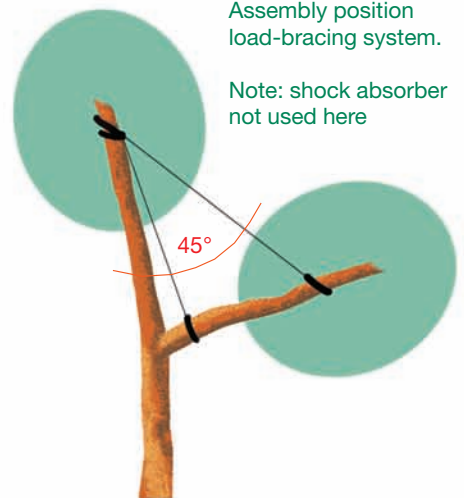
Assembly position  
Bracing system



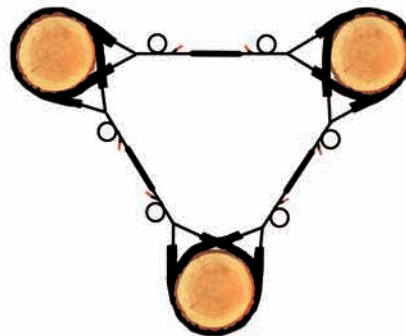
In the case of a **load-bracing system**, the height is not as important as ensuring that the cables are as vertical as possible.

Assembly position  
load-bracing system.

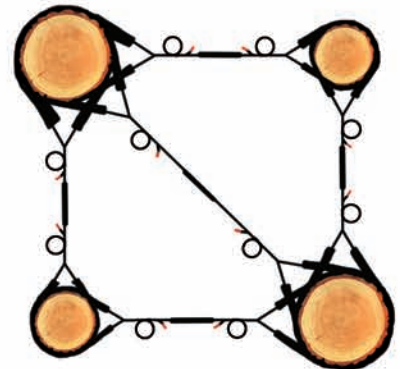
Note: shock absorber not used here



Triangular cabling system



Box cabling system



The ring bracing system is usually sufficient.

A diagonal support need be added only when stems must be further secured (for example, V-forked branches), possibly without a shock absorber.

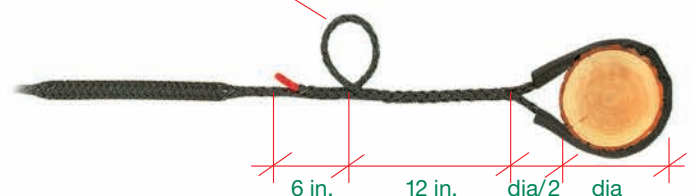
Cable length needed



Long expansion band,  
approximately the same  
circumference as branch

Distance between insertion points  
Branch circumference + 20 cm

Tension and compensation loop



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